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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,058	03/29/2006	Berndt Cramer	101914662	7986

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EXAMINER	
RIPA, BRYAN D	
ART UNIT	PAPER NUMBER
4111	
MAIL DATE	DELIVERY MODE
12/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,058	CRAMER ET AL.	
	Examiner	Art Unit	
	BRYAN D. RIPA	4111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/29/06* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/29/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13–17, 22–28, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Kato et al. (U.S. Pat. No. 5,866,799) (hereinafter referred to as "Kato-99"

Regarding claim 13, Kato-99 teaches a sensing element having a solid electrolyte 4c, at least one electrochemical measuring cell with a first electrode 24 and a second electrode 22 or 28 electrically connected by the solid electrolyte 4c, a first element 38 including a catalytically active material (col. 19 lines 23–50), a second diffusion-limiting element 14, a gas chamber 6 or 8 communicating with a measuring gas located outside of the sensor element and in which the second electrode 22 or 28 respectively is situated, and the first element 38 having a length of at least 1 mm in the diffusion direction of the measuring gas (see col. 16 lines 38–44; figure 14).

Regarding claims 14 and 15, Kato-99 teaches the use of the sensor element for detecting a physical property of a measuring gas (see col. 8 lines 39–44), including the determination of the oxygen partial pressure in the measuring gas (see col. 12 lines 19–32).

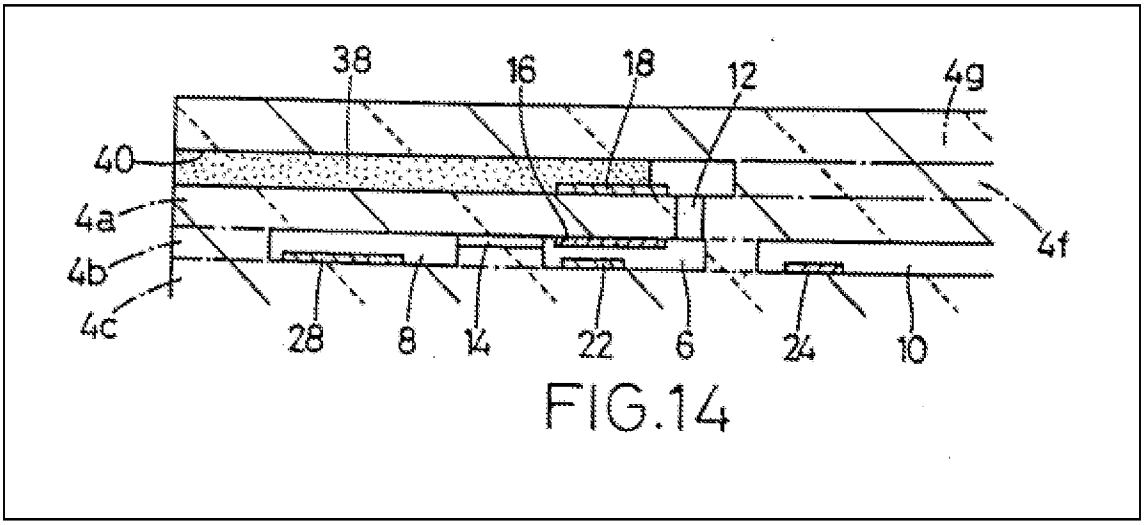

FIG.14

Regarding claims 16, 23, and 24, Kato-99 teaches the first element 38 being made of a channel filled with a porous material (see col. 19 lines 27–31).

Regarding claim 17, Kato-99 teaches the first element having a length of around 5.2 mm (see discussion at col. 16 lines 38–44 discussing the positioning of electrode 16 as being 5.2 mm from the end of the sensor).

Regarding claim 22, Kato-99 teaches the diffusion cross-section of the first element 38 being larger than the diffusion cross-section of the second diffusion-limiting element 14 (see figure 14 and col. 7 lines 64–66).

Regarding claim 25, Kato-99 teaches the second diffusion-limiting element 14 being situated between the first element 38 and the gas chamber 8 (see figure 14).

Regarding claim 26, Kato-99 teaches the use of constriction 14 which is on a side of the first element, separated by electrolyte layer 4a, facing toward the flow of the measuring gas (see figure 14).

Please note that in interpreting claim 26 the examiner is considering the possibility that the second diffusion-limiting element itself could act as the constriction. As described in the specification on page 8, the constriction may consist of a porous material or a channel having a smaller cross-sectional area. Moreover, the second diffusion-limiting element could also either be made by the addition of a porous material into the channel or a constriction in the channel.

Regarding claims 27 and 28, Kato-99 clearly shows the length of constriction 14 being within the range of 10% to 100% of the length of the first element 38 (see figure 14).

Regarding claim 30, Kato-99 teaches the second diffusion-limiting element 14 being in a layer plane of the measuring gas chamber 8 (see figure 14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 18–21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato-99.

Regarding claim 18, Kato-99 does not teach the first element 38 having a length in the range of 2 mm to 5 mm. However, Kato-99 does teach the first element 38 having a length around 5.2 mm (see figure 14 and col. 16 lines 38–44). The courts have held a claimed device to not be patentably distinct over a prior art reference where the only difference between the prior art and the claims is a recitation of relative

dimensions when the claimed device would not perform differently (see MPEP 2144.04 discussing *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984)).

Here, the first element 38 as taught by Kato-99 would perform just as the claimed length, if not better, because the length taught by Kato-99 is larger than the claimed range. As such, since the prior art device would function just as the claimed device the recitation of different dimensions fails to make the claim patentably distinct.

"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The discovery of an optimum value of a known result effective variable, without producing any new or unexpected results, is within the ambit of a person of ordinary skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05, II.).

Consequently, it would have been obvious to one of ordinary skill in the art to adjust the length of the first element in order to provide sufficient surface area in which to catalyze the non-reacted contaminates.

Regarding claim 19, Kato-99 does not teach the porosity of the second diffusion-limiting element 14 being at least half that of the first element 38. However, Kato-99 does teach the use of two porous sections as the two diffusion means (see figure 18a and col. 23 lines 8–17) and also discloses the favorability of the second diffusion-limiting element having a diffusion resistance larger than that of the first (see col. 7 lines 64–

66). It is well known in the art that having the diffusion resistance of the second diffusion section larger than the diffusion resistance of the first diffusion section helps to prevent contamination from harmful constituents in the exhaust gas thereby extending the life of the sensor (see col. 7 line 67–col. 8 line 2).

Consequently, it would have been obvious to one of ordinary skill in the art to adjust the porosity of the two diffusion sections in order to prolong the usability of the gas sensor.

Regarding claims 20 and 21, Kato-99 is silent as to the volume filled by the porous first element 38. However, it would have been obvious to one of ordinary skill in the art to change the size/proportion of the first element as needed in order to have a sufficient diffusion distance through the catalyst laced porous region in order to catalyze all the non-reacted components in the exhaust gas (see MPEP § 2144.04). The change in size of an article is not a matter of invention. See *In re Rose*, 105 USPQ 237 (CCPA 1955) (see MPEP § 2144.04).

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato-99 in view of Kato et al. (U.S. Pub. No. 2001/0008211) (hereinafter referred to as "Kato-01").

Regarding claim 29, Kato-99 does not teach the presence of a porous material in the constriction. However, Kato-01 teaches the use of either a porous material or a constriction as a means for providing a diffusion resistance (see Kato-01 paragraph 55).

The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int'l v. Teleflex Inc.*, 82 USPQ2d 1385, 1397 (2007) (see MPEP §2143). Moreover, it is prima facie obvious to combine elements taught in the prior art which are useful for the same purpose to form another element useful also for the same purpose. See *In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980) (see MPEP §2144.06).

Additionally, the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

The use of both a porous material and a constriction as a diffusion rate determining means were each known in the prior art. One skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the constriction in the device of Kato-99 by inserting a porous material in order to further increase the diffusion resistance.

Furthermore, it would have been obvious to one of ordinary skill in the art to adjust the porosity of the inserted porous material in the constriction in order to achieve the desired diffusion resistance.

The courts have held a claimed device to not be patentably distinct over a prior art reference where the only difference between the prior art and the claims is a

recitation of relative dimensions when the claimed device would not perform differently (see MPEP 2144.04 discussing *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984).

Additionally, claims 13–30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stahl et al. (D.E. Pat. Pub. 10013882) with English translation provided by U.S. Pub. No. 0154764 (hereinafter referred to as "Stahl") in view of Kato-99.

Regarding claim 13, Stahl teaches a sensing element having a solid electrolyte 11a or 11c, with at least one electrochemical measuring cell with a first electrode 20 or 23 and a second electrode 21 or 22 electrically connected by the solid electrolyte 11a or 11c respectively, a first element 14a including a catalytically active material (paragraphs 22–24), a second diffusion-limiting element 12, a gas chamber 13 communicating with a measuring gas located outside of the sensor element and in which the second electrode 21 or 22 respectively is situated (see figure 2; paragraphs 1 and 25).

Stahl does not explicitly teach the first element 14a having a length of at least 1 mm in the diffusion direction of the measuring gas.

However, Kato-99 teaches the porous diffusion layer 38 having a catalytically active material and having a length of at least 1 mm in the diffusion direction of the measuring gas (see col. 16 lines 38–44).

The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395–1397 (2007) (see MPEP § 2143).

Consequently, as shown by Kato-99 it would have been obvious to one of ordinary skill in the art to have adjusted the length of the catalytic porous layer in order to ensure the catalyzed reaction of the non-reacted components of the measuring gas.

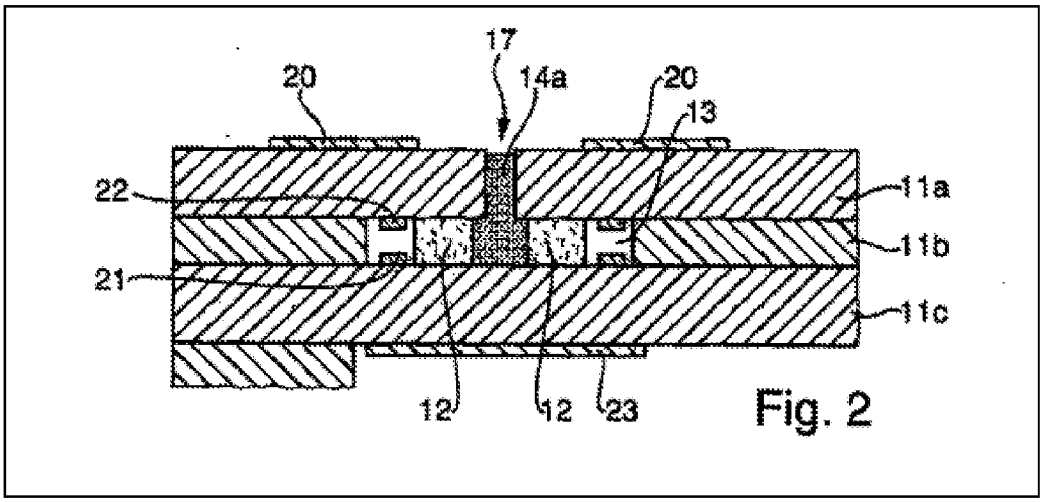

Fig. 2

Regarding claims 14 and 15, Stahl implicitly teaches the use of the sensor element discussed above for detecting a physical property of a measuring gas, including the determination of the oxygen partial pressure in the measuring gas. Stahl discloses that the sensor element is to be used to determine the concentration of gas components particularly in the exhaust gases of a combustion engine (see abstract). The sensor could clearly be used as a Nernst detection cell to detect the oxygen concentration by measuring the partial pressure of oxygen in the measuring gas relative to the ambient air.

"[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). See MPEP § 2144.01.

Regarding claims 16, 23, and 24, Stahl teaches the first element 14a being made of a channel filled with a porous material (see paragraph 22). Furthermore, Stahl also teaches the second diffusion-limiting element being made of a porous material (see paragraph 19).

Regarding claim 17, as discussed above regarding claim 13, Kato-99 specifically teaches the first element having a length of around 5.2 mm (see discussion at col. 16 lines 38–44 discussing the positioning of electrode 16 as being 5.2 mm from the end of the sensor).

Regarding claim 18, Kato-99 does not teach the first element 38 having a length in the range of 2 mm to 5 mm. Furthermore, as mentioned above Stahl is silent as to the length of the diffusion barrier 14. However, as discussed above regarding claim 17, Kato-99 does teach the first element 38 having a length around 5.2 mm (see figure 14 and col. 16 lines 38–44). The courts have held a claimed device to not be patentably distinct over a prior art reference where the only difference between the prior art and the claims is a recitation of relative dimensions when the claimed device would not perform

differently (see MPEP 2144.04 discussing *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984)).

Here, the first element 38 as taught by Kato-99 would perform just as the claimed length, if not better, because the length taught by Kato-99 is larger than the claimed range. As such, since the prior art device would function just as the claimed device the recitation of different dimensions fails to make the claim patentably distinct.

"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The discovery of an optimum value of a known result effective variable, without producing any new or unexpected results, is within the ambit of a person of ordinary skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05, II.).

Consequently, it would have been obvious to one of ordinary skill in the art to adjust the length of the first element while still providing sufficient surface area in which to catalyze the non-reacted contaminates.

Regarding claims 19 and 22, Stahl teaches the second diffusion-limiting element (12) being a fine-pored barrier (see paragraph 29) and the first element being a course pored barrier (see paragraph 22). Stahl, however, is silent as to the exact proportion of pores or the diffusion cross-section of each respective barrier.

However, one of ordinary skill in the art at the time of the invention would adjust the porosity/diffusion cross-section of the two diffusion sections in order to optimize the

detection capability of the sensor and to prolong the usability of the gas sensor. Consequently, adjusting the diffusion resistance of the first element to be half that of the second diffusion-limiting element, by either altering the porosity or the diffusion cross-section by some other means, would have been obvious to one of ordinary skill in the art.

Regarding claims 20 and 21, Stahl and Kato-99 are silent as to the volume filled by the porous first element 14a and 38. However, it would have been obvious to one of ordinary skill in the art to change the size/proportion of the first element as needed in order to have a sufficient diffusion distance through the catalyst laced porous region in order to catalyze all the non-reacted components in the exhaust gas (see MPEP § 2144.04). See *In re Rose*, 105 USPQ 237 (CCPA 1955) (see MPEP § 2144.04).

Regarding claim 25, Stahl teaches the second diffusion-limiting element 12 being situated between the first element 14a and the gas chamber 13 (see figure 2).

Regarding claim 26, Stahl teaches the use of constriction 17 which is on a side of the first element 14a facing toward the measuring gas (see figure 2).

Regarding claims 27 and 28, Stahl clearly shows the length of constriction 17 being within the range of 10% to 100% of the length of the first element 14a (see figure 2).

Regarding claim 29, Stahl teaches the porous material being provided in the area of the constriction (see figure 2 and paragraph 25). Stahl is silent, however, as to the size of the pore diameter of the porous material in the constriction in relation to the dimensions of the constriction.

However, it would have been obvious to one of ordinary skill in the art to adjust the porosity of the inserted porous material in the constriction in order to achieve the desired diffusion resistance while still providing sufficient catalyzed surface area.

The courts have held a claimed device to not be patentably distinct over a prior art reference where the only difference between the prior art and the claims is a recitation of relative dimensions when the claimed device would not perform differently (see MPEP 2144.04 discussing *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984).

Regarding claim 30, Stahl teaches the second diffusion-limiting element 12 being in a layer plane of the measuring gas chamber 13 (see figure 2).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references include:

1. Nakagawa et al. (U.S. Pat. No. 4,707,241) teaches a standard oxygen sensor having electrodes separated by a solid electrolyte and a gas chamber.

2. Paulus et al. (U.S. Pat. No. 5,733,504) teaches the use of a porous first element having a catalyst and a second diffusion-limiting barrier in an oxygen sensor.

3. Schonauner et al. (U.S. Pat. No. 5,969,232) teaches the use of a porous first element having a catalyst and a second diffusion-limiting barrier in an oxygen sensor.

4. Friese et al. (U.S. Pat. No. 5,423,973) teaches the use of a protective porous layer covering the diffusion limiting layers above the sensing electrode.

5. Riken (E.P.O. Pat. Pub. 1167957) teaches a gas sensor having a gas detection chamber with a constriction before the porous catalytic first element and after.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYAN D. RIPA whose telephone number is 571- 270-7875. The examiner can normally be reached on Monday to Friday, 9:00 AM to 4:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sines can be reached on 571-272-1263. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. D. R./
Examiner, Art Unit 4111

/Brian J. Sines/
Supervisory Patent Examiner, Art Unit 4111